

UNIT V: CRITICAL SITUATIONS

This unit covers emergencies induced by roadway factors, vehicle malfunctions and driver errors. The unit focuses on how to handle the emergencies (causes and responses), not how to prevent them from occurring. Specifically, instruction covers how to regain control of a vehicle, how to avoid collisions and how to respond to vehicle failures. The unit concludes with instruction on how to control the scene of an accident.

INSTRUCTIONAL OBJECTIVES

Knowledge Objectives

Students will know:

Skid Recovery

1. Procedures for handling vehicle skids
2. Procedures for returning to the roadway after running off the travel lane.

Evasive Responses

1. Procedures to follow in making evasive maneuvers (quick acceleration, quick stop, quick turn).

Vehicle Failures

1. Common vehicle failures which drivers must handle immediately
2. The most critical procedural elements to follow in responding to vehicle problems.

Controlling Accident Scenes

1. The basic procedures for protecting an accident scene
2. The need for, and limitations of, their providing first aid
3. The need to obtain emergency medical services quickly.

Attitude Objectives

Students will accept that:

1. They can act in an emergency situation to avoid or reduce the consequences of a collision
2. Improper acts can worsen an accident situation.

The entire unit can be covered through presentation. Visuals (especially film or video) can be useful in communicating the rapidity with which evasive responses must be executed and the dynamics of steering input/vehicle response in the maneuvers.

SKID RECOVERY

Drivers may find their vehicles starting to skid whenever they drive too fast for conditions.

Causes of Skids

There are three basic causes of skids:

- Overacceleration--drive wheels spinning too fast to maintain adequate traction with the road surface. In a rear wheel skid, the rear wheels have less friction than the front wheels and so move faster.
- Oversteering--occurs when driver turns vehicle too severely for the vehicle's speed. In this situation, the rear of the vehicle wants to continue in a straight line. When it overcomes the side (turning) force of the front tires, it does. A speed of 5 mph may be too fast on icy roads, creating an oversteering situation.
- Overbraking--braking too hard can lock the wheels. Since locked wheels produce less traction than rolling, the rolling wheels (with better traction) can overpower them and send the vehicle into a skid.

Correcting a Skid [Visual 20 (Skid Recovery) may be used here.]

To correct a skid, drivers should:

- Stay off the brake. Hitting the brakes may lock the wheels and make the skid worse.
- Ease off the gas pedal--to reduce speed, helping tires get better traction.
- Turn the steering wheel quickly in the direction they want the car to go. In turning the wheel, drivers should consciously oversteer to get the rear end going in the proper direction.
- Quickly countersteer--to keep the rear end from skidding out in the opposite direction. Drivers should commence countersteering as soon as the car starts to line up. If they wait until the car has straightened out before countersteering, it will be too late to keep the rear from continuing in the opposite direction.
- Continue to correct steering, right and left, until the vehicle has completely recovered from the skid.

Off Road Recovery

Many accidents occur when drivers who have gone onto a shoulder (either deliberately or inadvertently) attempt to get back onto the roadway.

Hazards

- The front wheels have difficulty climbing over the edge of the pavement.
- The driver will turn the steering wheel at a rather sharp angle, so the tires will face the edge "straight on."
- Since the shoulder material provides less traction than the roadway, the driver must accelerate hard to force the front tires over the edge.
- When the drive wheels get onto the roadway, they find better traction. The result is a slingshot effect, which may carry the car across the lanes of traffic at the angle of entry.

Techniques

To return to the road safely, drivers should:

1. Allow the car to slow as much as possible before trying to get back onto the road. Bring the car to a complete stop if there is enough room.

2. Turn steering wheel sharply to the left, so that the left front wheel will drop over the edge of the pavement (when the driver is ready, not unexpectedly).
3. Be prepared to turn the wheel sharply to the right as soon as both front wheels are on the pavement. Driver should execute both turns as a single "left-right" maneuver.

EVASIVE RESPONSES

True emergencies should arise only rarely for drivers who maintain good seeing, speed management and space management practices.

Even careful drivers can find themselves in emergency situations created by others who are not looking or controlling their speed properly.

Because true emergencies seldom occur, most drivers are not well prepared to handle them.

- Handling them safely requires rapid analysis of the situation and selection of the correct response.
- It requires that the responses be executed quickly. Unfortunately, crash avoidance maneuvers require skills that are seldom used.

Common Errors

The most common errors drivers make in situations requiring evasive maneuvers:

- Failure to respond -- The driver just "freezes" at the wheel.
- Overbraking -- This locks up the wheels; the reduced traction from locked wheels increases stopping distance and may send the vehicle into a skid.
- Failure to select proper maneuver -- Driver hits brake, when situation more easily evaded by another maneuver.

The three best ways to avoid collisions are: stop quickly, turn quickly, or accelerate quickly.

Emergency Stop

Stopping can be an excellent response to emergencies ahead because (1) it reduces speed, buying the driver time to prepare for another maneuver, and (2) it will reduce the force of impact (lower speeds equal lower impact forces) with object that may be hit.

Stopping Technique

To execute an emergency stop:

1. Apply the brakes quickly
2. Push hard until wheels are just on the verge of locking
3. Quickly release the brake, then immediately push down again, hard, until just shy of the lock point.
4. Continue this pumping action until the car comes to a complete stop.

Brake Application

The key to a quick stop is to apply the brakes until they are just short of lockup.

- It is at that point where brakes provide their maximum stopping power.
- If the wheels do lock, the driver cannot control the direction of the vehicle or stop as quickly as when the tires are rolling.

- The driver must release the brakes until the wheels begin rolling again, then resume braking.
- Drivers should realize that the pumping action is not the goal, but rather the result of overapplication of the brakes.
- Ideally, the driver should brake until just short of lock up and keep brakes in that position--eliminating the need to pump.

Emergency Turn

While stopping is the most natural response, it is not always the best response.

- It is hard to judge space available in a split second. There may not be enough space to stop.
- Stopping requires more open space than a quick turn. After all, a quick turn requires the driver to move only eight feet to the left or the right.
- A quick stop may be a poor option if the driver is being tailgated. In this situation, drivers may avoid hitting the vehicle ahead, only to find themselves rear ended.
- Emergency turns require less space ahead than emergency stops because it does not leave the tires working diametrically opposed to the forward motion of the car. Additionally, turning gives drivers two options--they can go either left or right--versus the single option provided by an emergency stop.

Direction of Turn

- A quick turn to the left can be dangerous. Unless the driver's pre-emergency scanning has indicated that there will be no conflict with traffic from either direction in the left lane, a driver may avoid a crash ahead only to pull into a crash to the left.
- Drivers who do not have time to stop or room to turn left, may still be able to turn to the right. It would be better to run completely off the road than to hit another car.

Hand Position

To make an emergency turn, the driver's hands must be in the correct position on the steering wheel.

- The only way to make an emergency turn is for the hands to be in the 3 o'clock/9 o'clock position as a full turn of the wheel is necessary.
- This is why drivers should always have their hands at these positions. That way they are prepared to make an emergency turn.

Turning Technique [Visual 21 (Emergency Turn) may be used here.]

To make an emergency turn to the left, drivers should:

1. Turn the steering wheel a full half circle (180°) in the direction of the turn
2. "Countersteer" immediately by turning the wheel in a full circle (360°) in the opposite direction. This will head the car back toward the original lane
3. As the car begins to return to the original lane, turn the wheel a full half circle (180°) back to the left, at which point the hands will be in the original position.
4. After returning to the original path, the driver may need to continue countersteering until all skidding is under control.

To turn quickly to the right, driver should simply reverse the process: first making a half circle right, then a full circle left, and ending with another half circle right.

Countersteering

The first two turns (half circle left, full circle right) must be made as one continuous maneuver. Driver must be ready and able to countersteer immediately.

- If make first half-circle turn and don't immediately countersteer, will go into uncontrolled skid.
- If are thrown away from wheel (by force of first half-circle turn), won't be able to recover in time to countersteer.

Braking

Throughout the quick turn maneuver, drivers must keep off the brakes.

- Braking will only reduce the driver's ability to control the skid, especially if the driver has turned onto a soft shoulder.

Quick Acceleration

- up quickly may be the best way to avoid conflicts from the side (cross traffic). Though it is a natural reaction to hit the brakes when a car is spotted approaching from the side, drivers must fight this tendency if there is not enough room to stop.
- To accelerate quickly, drivers should push the gas pedal all the way to the floor.
- If driving a vehicle with manual transmission, the driver should first shift to the next lowest gear and then floor it.

[Visual 22 (Which Maneuver?) may be used here for problem solving.]

VEHICLE FAILURES

The overwhelming majority of accidents are caused because of driver error. Vehicle failure accounts for less than 5% of all accidents. Most types of vehicle failure that result in accidents could have been prevented by regular vehicle inspection and normal maintenance.

Drivers are responsible for maintaining their vehicles in safe condition. After all, if their vehicle lets them down and causes an accident, it's the driver--not the car--that gets the ticket.

Brake Failure

If the brakes suddenly give out, driver should:

- a. Pump the brake pedal rapidly and hard, several times. Often this will build up enough brake pressure to stop the car.
- b. If pumping doesn't work, apply the parking brake. Be sure to keep hand on brake release, so brakes can be released if the rear wheels lock and the car starts to skid.
- c. Shift to low gear and look for place to slow for a stop. This is the least desirable option, as it could force the car to stall on the road. It can be very dangerous if the driver is being tailgated.

Whichever compensating technique is used, the driver must be sure to pull the car completely off the roadway before coming to a stop. After stopping, the driver should call for help. Under no circumstances should the driver try to drive the car to a mechanic.

Flat Tire

A tire can go flat on the road either through a slow leak or through a sudden "blow out." The term "blow out" is somewhat misleading, as many drivers expect to hear a loud pop. Tires can

without making a sound. Even if they do, drivers may not hear it or may think it is coming from some other vehicle.

Cues to Flat Tire

When a tire is completely flat (wheel rim pressing on rubber), the driver will hear a loud "thump-thump-thump." However, tires will often give clues to the driver before thumping begins that they are about to go flat:

- As a front wheel begins to go flat, the steering will start to feel "mushy." The front end may begin to wander.
- As a rear wheel goes flat, the rear end may start to "fishtail."

Procedures for Handling Flat Tire

No matter what the location of the tire, when it goes flat the driver should hold the steering wheel tightly and:

1. Slow gradually by easing the foot off the accelerator.
2. When moving slowly enough, steer the car off the road.
3. Apply brakes when the car has almost stopped.

Drivers must remember that, if they start braking while the car is moving fast, the reduced traction from the flat can send them into a skid.

Steering Failure

In cars with power steering, the steering system will fail if the engine dies. Usually, engine dies as driver slows to make a turn. When this happens, drivers should:

1. Pull hard with both hands on the wheel to complete the turn or to move the car off the roadway.
2. Stop the car. Drivers should remember that they will have to push extra hard if the car has power brakes.
3. Restart the engine.

Stuck Accelerator

If a car does not respond (slow down) when the driver eases up on the accelerator, the driver should:

1. Keep eyes on the road. Don't look at the accelerator.
2. Quickly shift to NEUTRAL.
3. Pull off the road as soon as possible.
4. Turn off the engine as soon as the car has braked to a stop.

Drivers should remember that, if the car has power steering and brakes, turning the engine off while the car is moving will only make it harder to handle. Shifting to NEUTRAL lets the driver use these power options while removing power from the drive axle.

Headlight Failure

If the headlights suddenly go out, driver should:

1. Try the dimmer switch. Low and high beams operate independently.
2. If the dimmer switch does not provide light, try the on-off headlight switch a few times.
3. If flicking the on-off switch does not restore light, turn on emergency flashers, parking lights or turn signals. Some light is better than none.
4. Pull off the road as soon as possible, and leave emergency flashers on.

Hood Latch Failure

If the car's hood suddenly flies up, drivers must:

1. Slow down.
2. Try to peek over the dash and under the hood to see.
3. If there is no gap between dash and hood, put head out window and try to look around the hood. Use the lane marking or center line as a reference for location and lane.
4. Get off the road as quickly as possible.

General Guidelines for Coping with Vehicle Failure

Whatever the type of emergency a driver's vehicle presents, drivers should always follow these guidelines:

- Respond quickly.
- Don't make the problem worse for themselves (e.g., by braking the car into a skid when a tire blows) or for others (e.g., by jamming on the brakes when being tailgated).
- Get off the road as quickly and safely as possible.
- Be sure the problem is corrected before resuming driving.

Drivers who try to "nurse" a disabled vehicle back to their place or to a garage run the risk of having an accident--adding body damage (theirs and the car's) to the cost of towing. Instead of needing just a simple mechanical repair, the vehicle and the driver may be totaled.

CONTROLLING ACCIDENT SCENES

A driver who is involved in an accident or comes upon an accident that others have had is responsible for doing two things:

1. Making sure that the accident does not get worse (i.e., cause another accident), and
2. Getting professional help to control the scene of the accident and provide medical care.

Protecting The Scene

The first responsibility of a driver who is involved in an accident, is to warn others of the problem, so that they can avoid hitting the people and vehicles already involved in the crash.

- To help others realize a crash has occurred, drivers should follow the same procedures discussed in the earlier section on communicating breakdowns: getting the vehicles as far off the road as possible, and setting out flares or warning triangles well behind the crash.
- Activate emergency flashers or any other lights that are still working. If no flares are available, someone should go up the road to warn traffic by waving their arms. (The warner must be clearly visible--e.g., light clothing, flashlight at night--and stand out of the roadway.)
- Driver should remember that, if the crash scene is "hidden" by a hill or curve, the flares, etc., should be placed behind the car on the other side of the hill or curve.

Drivers who have come upon an accident, should stop to help.

- Drivers must be sure to park beyond the crash scene. If they park before the crash scene, their vehicle will obscure the view of the accident by others approaching from behind. Others may not recognize the situation, increasing the risk of a rear end collision.
- By parking behind an accident vehicle, a driver reduces the open space available to drivers coming from the rear that may be needed to steer around the accident.
- In pulling beyond the accident site, drivers should be sure to park off the road, so that traffic passing the accident can get back into that lane as quickly as possible.

Getting Help

After taking these steps to assure that the crash site is protected, drivers should notify emergency services (police and medical) that a crash has occurred. In calling (911 in most locations), drivers should be sure to:

- Identify themselves--so emergency personnel won't mistake it for a crank call.
- Describe the location of the crash as exactly as possible--so emergency personnel can get to the scene without unnecessary delay.

Caring For The Injured

Once drivers have arranged for professional assistance, they should try to care for the injured until that help arrives:

- Drivers should not try to play doctor.
- Their goal should be only to sustain life until the professionals can get there.
- Trying to do too much for the injured may only make their injuries worse.

Yield to Medical Knowledge

If someone else is available who knows more about first aid than the driver, the driver should let the person with the greatest medical knowledge take the lead in helping the injured. Drivers should stay out of the way of people who know more, unless their assistance is specifically requested by those with medical knowledge.

Sustain Life Only

In trying to sustain life, drivers should follow basic first aid procedures:

- Don't move the injured unless it is absolutely necessary. Injured people should be moved only if they are in imminent danger of suffering greater damage. Examples: if gas is leaking from vehicle, there is danger of an explosion; if person is in the road, they may be in danger of being hit by traffic.

- Try to keep the injured from moving themselves. Any unnecessary movement can worsen an injury. Example: if the spine has been injured, additional movement may result in paralysis.
- Keep the injured warm. In an accident, both injured and uninjured occupants are likely to suffer shock, which lowers the heart rate and body temperature. Occupants should be covered with jackets, blankets or whatever comes to hand.
- Try to stop any bleeding. To stop severe bleeding, apply direct pressure to the source of the blood.
- Keep an eye on all victims. Watch those who are obviously injured for any sign of a sudden worsening in their condition. Watch those without any apparent injury, because they may have sustained internal injuries.

All occupants should be kept still and warm until medical professionals can check them out.